priced very similarly to AT&T's cable modem service. Clearly, cable modem service is likely to continue to attract customers from dial-up service in large numbers as customers become increasingly aware of the small price differential between them.

TABLE 5
COMPARISON OF RESIDENTIAL DIAL-UP AND BROADBAND

Line		2nd Line Dial-Up provided by Ameritech Illinois	Cable Modem Provided by AT&T	ADSL provided by AADS
1	Equipment and Installation	$ 2.22	$ 1.39	$ 8.31
2	Network Access	$ 5.63	--	--
3	Local Usage	$ 1.50	--	--
4	IntraLATA Toll	Not used	--	--
5	InterLATA Toll	Not used	--	--
6	ISP	$ 19.95	$ 39.95	$ 49.95
7	USF, LNP, Taxes	$ 6.45		
8	Total	$ 35.75	$ 41.34	$ 58 .26

Notes:
Line (1) Modem and installation costs are amortized over 36 months. For cable modem service, a $10.00 rental fee is included in the monthly $39.95 ISP payment.
Line (2) Monthly access line from Ameritech Illinois.
Line (3) 30 ISP call per month at $0.05 per call.
Line (6) Microsoft's MSN unlimited use Internet access.
Line (7) For dial-up: LNP: $0.28, 2nd line Fed EUCL: $4.55, USF: $0.37, Infrastructure maintenance fee/credit: $-0.565, State additional Charges: $0.01, Fed/State/Local tax: 15%. No taxes included for ISP, cable modem or ADSL.

III. THE PROJECT PRONTO UNBUNDLING AND COLLOCATION REQUIREMENTS UNDERMINE ANY RATIONAL ECONOMIC BASIS FOR AMERITECH ILLINOIS TO DEPLOY A NEW BROADBAND DATA INFRASTRUCTURE

Q. Dr. Aron, are you aware that SBC and Ameritech Illinois announced that they have cancelled deployment of Project Pronto DSL facilities in Illinois as a result of the Commission's Order requiring Project Pronto DSL unbundling/NGDLC line card collocation, at least until the outcome of this rehearing is determined?

A. Yes.

Q. In light of all the consumer benefits of ADSL service that you have discussed, and the pent-up demand for it in Illinois, why would SBC make such a decision?

A. As an economist, I believe there are at least two rational reasons that any company in SBC's position would decide not to make the Pronto DSL investment in Illinois in light of the Commission's Order. Briefly, and as I will explain more fully below, the two reasons are that few firms would want to make risky investments in a situation where they are deprived of the control and deployment of those assets. The second reason is that that the unbundling requirements impose additional costs on SBC that could have a material impact on the ability of DSL carriers to compete successfully with cable modems, and which ultimately might not be recoverable at all.

Q. Please explain the first reason.

A. Under the Commission's Order, Ameritech Illinois would be required to unbundle its next generation digital loop carrier ("NGDLC") line cards and ATM-based transport capacity (namely, its permanent virtual paths, "PVPs"), among other pieces of its Pronto DSL architecture, and provide those elements to competitors. To understand the effect of these requirements, it is important to understand the reason that CLECs want unbundled access to these elements. And for this it is helpful to first recall that independent of the Commission's Order, Ameritech Illinois has agreed (and is required by the FCC's *Project Pronto Order*[50]) to offer a wholesale Broadband Service at TELRIC-based rates as part of its planned deployment of Pronto DSL facilities. That means that CLECs would be able to purchase wholesale ADSL from Ameritech Illinois, which they could then sell to their customers. Moreover, Ameritech Illinois' wholesale Broadband Services offering would eliminate the need for CLECs to collocate DSLAMs or other DSL equipment. The CLEC

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[50] Second Memorandum Opinion and Order, in CC Docket No. 98-141, *Amertitech Corp. and SBC Communications, Inc.*, and ASD File No. 99-49, *For Consent to Transfer Control of Corporations Holding Commission Licenses and Lines Pursuant to Sections 214 and 310 (d) of the Communications Act and Parts 5, 22, 23, 25, 63, 90, 95 and 101 of the Commission 's Rules,* FCC 00-336 (2000) (hereinafter "Project Pronto Order").

would have the opportunity to purchase the service on a line-by-line basis, at prices based on the forward looking, long run incremental cost of providing the service. In light of this offering, one might wonder why CLECs would want direct access to the "Project Pronto UNEs" and the remote terminal DSL equipment – i.e., the Alcatel Litespan 2000 or 2012 NGDLCs and its component parts. My understanding of the Commission's Order is that CLECs want access to this equipment because they want to be able to provide services that are *different* from the ADSL services that SBC contemplated when it designed, evaluated, and decided to build the Project Pronto system.[51]

Q. What might such services be?

A. There are many different types of DSL technology. Table 6 presents a sample of these technologies and briefly summarizes their characteristics. Some of these are very high bandwidth services.

Q. Is not it good for consumers to have more choice of services?

A. It might or it might not be, depending on the additional cost caused by the additional variety. It is well understood in economics that there is often a tradeoff between the efficiency gains from producing fewer products or services, and the benefits of producing a greater variety of services, at the cost of some loss of efficiency in the production of each.[52] But even if additional variety were desirable, the problem is that mandating its provision by depriving a firm of control of the use of its assets can rationally and reasonably sway the firm against making the investment to begin with. The latter outcome would not benefit consumers; on the contrary, consumers would be harmed.

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51 Order in ICC Docket No. 00-0393, March 14, 2001, p. 20.

52 See, for example, Carlton, Dennis W. and Jeffrey M. Perloff, *Modern Industrial Organization*, Scott, Foresman/Little, 1990.

Table 6: Other Variations of DSL Technology

DSL Type	Description	Maximum Data Rate – Downstream; Upstream	Distance Limit	Application
IDSL	ISDN Digital Subscriber Line	128 Kbps; 128 Kbps	18,000 feet on 24 gauge wire	Similar to the ISDN BRI service but data only (no voice on the same line)
CDSL	Consumer DSL from Rockwell	1 Mbps downstream; less upstream	18,000 feet on 24 gauge wire	Splitterless home and small business service; similar to DSL Lite
DSL Lite (same as G.Lite)	"Splitterless" DSL without the "truck roll"	From 1.544 Mbps to 6 Mbps downstream, depending on the subscribed service	18,000 feet on 24 gauge wire	The standard ADSL; sacrifices speed for not having to install a splitter at the user's home or business
G.Lite (same as DSL Lite)	"Splitterless" DSL without the "truck roll"	From 1.544 Mbps to 6 Mpbs , depending on the subscribed service	18,000 feet on 24 gauge wire	The standard ADSL; sacrifices speed for not having to install a splitter at the user's home or business
HDSL	High bit-rate Digital Subscriber Line	1.544 Mbps duplex on two twisted-pair lines; 2.048 Mbps duplex on three twisted-pair lines	12,000 feet on 24 gauge wire	T1/E1 service between server and phone company or within a company; WAN, LAN, server access
SDSL	Single-line DSL	1.544 Mbps duplex (U.S. and Canada); 2.048 Mbps (Europe) on a single duplex line downstream and upstream	12,000 feet on 24 gauge wire	Same as for HDSL but requiring only one line of twisted-pair
RADSL	Rate-Adaptive DSL from Westell	Adapted to the line, 640 Kbps to 2.2 Mbps downstream; 272 Kbps to 1.088 Mbps upstream	Not provided	Similar to ADSL
UDSL	Unidirectional DSL proposed by a company in Europe	Not known	Not known	Similar to HDSL
VDSL	Very high Digital Subscriber Line	1.5 to 2.3 Mbps upstream; 1.6 Mbps to 2.3 Mbps downstream	4,500 feet at 12.96 Mbps; 3,000 feet at 25.82 Mbps; 1,000 feet at 51.84 Mbps	ATM networks; Fiber to the Neighborhood

Source: ***Types of DSL***, downloaded from <<http://www.everythingdsl.com/types.html,>> June 1, 2001

Q. Why would depriving a firm of control of its assets influence it against making the asset-building investments?

A. Control is fundamental to the notion of ownership. From an economic perspective, what uniquely identifies ownership relative to other forms of contractual relationships is

control of the use (or non-use) of the asset. As Oliver Wendell Holmes explained in 1881,

> But what are the rights of ownership? They are substantially the same as those incident to possession. Within the limits prescribed by policy, the owner is allowed to exercise his natural powers over the subject-matter uninterfered with, and is more or less protected in excluding other people from such interference. The owner is allowed to exclude all, and is accountable to no one. The possessor is allowed to exclude all but one, and is accountable to no one but him.[53]

Modern economists take a similar view. For example, respected economists Oliver Hart and John Moore, in their work on the nature of property rights, explain that:

> ...the sole right possessed by the owner of an asset is his ability to exclude others from the use of that asset. That is, the owner of a machine can decide who can and who cannot work on that machine, the owner of a building can decide who can and who cannot enter the building, the owner of an insurance company's client list can decide who has and who does not have access to the list, and so forth.[54]

If a firm is deprived of control, it is deprived of the essence of ownership.

Q. How does ownership and control affect investment?

A. Economists recognize that most aspects of ownership can be mimicked by an appropriate contract. For example, rather than owning a home, I could engage in a rental arrangement by which a second party owns the property and I agree to certain financial and other obligations in exchange for the use of the home. In some ways this is very much like ownership from the resident's perspective—for example, the resident has the benefit of the use of the house and the ability to enter and exit at will on a day to day basis. However, from an economic perspective, one difference between owning and renting is that the owner has the ultimate right to determine the disposition of the home in situations that were not contemplated by the rental contract. For example, suppose that the resident

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53 Holmes, O.W., Jr., *The Common Law*, Little, Brown, and Company, 1881, p. 246.

54 Hart, Oliver and John Moore, "Property Rights and the Nature of the Firm," *Journal of Political Economy*, 1990, vol. 98, no.6, p. 1121.

marries and would like to put an addition on the house. Obviously, the owner, not the renter, has control over that decision. The two might negotiate an agreement under which the owner does construct an addition, in exchange for some increase in rent perhaps, but the terms of that agreement are ultimately under the control of the owner, who has the right to refuse.

It is possible that the owner and renter anticipated this eventuality and contracted in advance about what would happen if the renter got married and wanted an addition. But while this particular eventuality might have been anticipated, there is an infinite variety of others that could happen as well. It is impossible for every possible eventuality to be specified in a contract. Since no contract can possibly be "complete" in the sense of contemplating every possible eventuality, the economic perspective is that ownership constitutes the default rule governing who controls the asset in non-contracted eventualities. Again, it is control that defines and differentiates ownership from other forms of economic relationships.

The economic importance of ownership rights, then, is precisely the following. Economists recognize that ownership rights over an asset affect and determine the incentives to invest in the asset to begin with.[55] As Seventh Circuit Judge and renowned scholar of law and economics, Richard Posner, put it:

> It is highly desirable from an economic standpoint that valuable resources should be made subject to a right of exclusive use, control, and benefit in someone. Without such a right, incentives to invest in the production of valuable goods will be suboptional – for example, the owner of farmland will have no assurance that he will be able to reap where he has sown.[56]

Or as Nobel laureate Douglass North and co-author Robert Paul Thomas said succinctly:

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55 Sanford J. Grossman and Oliver D. Hart, "The Costs and Benefits of Ownership: A theory of Vertical and Lateral Integration," *Journal of Political Economy*, 1986, Vol. 94, No. 4, pp. 691-719; see also Milgrom, Paul and John Roberts, *Economics, Organization and Management*, Prentice Hall, Englewood Cliffs, 1992, Chapter 9.

56 Posner, Richard A., "Savigny, Holmes, and the Law and Economics of Posse ssion," *Virginia Law Review*, 86 Va. L. Rev. 535, April 2000, p. 10.

> Economic growth will occur if property rights make it worthwhile to undertake socially productive activity.[57]

In the example of the house, the renter has little incentive to make investments in the property because the renter cannot control the disposition of the property and therefore will not generally reap the benefits of such investments. When one party is deprived of control of an asset, it will generally underinvest in the asset, by which I mean invest less than is socially optimal. Depriving Ameritech Illinois of the control of its DSL assets by regulatory fiat would, correspondingly, lead Ameritech Illinois to underinvest in those assets. In this case in Illinois, the underinvestment has taken the form of cessation of the new DSL investment entirely.

Q. Please give an example of the problems that could arise if Ameritech Illinois were to deploy Project Pronto DSL assets and yet be deprived of the control of these assets as the Illinois Commission has ordered.

A. Consider one scenario that is enabled by the Commission's requirement that PVPs be unbundled, essentially depriving Ameritech Illinois of control of the use of its NGDLC investment. One reason that a CLEC might want to purchase an unbundled PVP is to offer very high bandwidth service to a few customers using a variation of xDSL technology identified in Table 6. Providing such a service might be extremely lucrative for a CLEC because these "bandwidth hogging" services are typically marketed to large businesses. As Mr. Keown explains, however, if a CLEC purchases an unbundled PVP, it deprives Ameritech Illinois of an entire channel bank, which could provide ADSL service up to 224 residential or small business customers[58] and constitutes fully 1/3 of its total DSL capacity at that remote terminal. While Ameritech Illinois might recover its "forward looking" cost of the PVP, it loses the ability to fulfill its business plan, which

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[57] North, Douglass C. and Robert Paul Thomas, *The Rise of the Western World: A New Economic History* , Cambridge University Press, 1973, p. 8.

[58] A channel bank has 224 ports, some fraction of which are typically needed for administration and testing. See Ameritech Illinois, Exhibit __ (Keown).

was to provide ADSL service to mass market customers, and its investors are forced by regulators to make investments in assets that would be used to implement technologies that they did not intend to risk their money in.

Moreover, this same CLEC or another CLEC could purchase a second PVP and a third, co-opting most or all of the capacity of the Pronto DSL architecture for uses other than that originally intended by those who put their money at risk. From SBC's perspective, it faces the possibility of being precluded entirely from offering its intended service, ADSL, while other carriers divert SBC's investment to other uses. SBC may or may not have the same confidence in those other uses as does the CLEC co-opting the capacity, and would be rational in not wanting the use of its investment to be at the whim of others.

Q. Are there any other reasons that CLECs might purchase PVPs?

A. Yes. Even a CLEC wanting to offer ADSL, and not an alternative service, might have strategic reasons for buying a PVP rather than buying Ameritech Illinois' wholesale Broadband Service. A CLEC could preempt a competitor from establishing a presence in an area by buying up the available capacity via PVPs. While this would presumably be a costly strategy, it might be worthwhile to a carrier who wants a first mover advantage in an area. Indeed, a carrier could foreclose all other DSL competitors from the Project Pronto architecture in an area by purchasing the three DSL PVPs serving an RT, and yet serve few customers. When a single "UNE" constitutes such a large part of the available capacity at a particular location, it suggests that strategic manipulation might be encouraged.

Q. But if Ameritech Illinois were not forced to unbundle its NGDLC line cards and/or PVPs, would that not deprive consumers of the variety of broadband services that would otherwise be forthcoming?

A. No. CLECs can offer other varieties of DSL by installing their own DSLAMs and using unbundled copper loops or subloop elements. To the extent that Project Pronto uses the legacy network (the copper subloops and wire center locations for example), those legacy network components are available to CLECs via unbundling.

Q. Please explain the second reason that a rational firm might not deploy Project Pronto under the circumstances in Illinois.

A. The unbundling requirements of the Commission's Order would impose additional costs on Ameritech Illinois that would disadvantage DSL relative to its closest competitor, cable modem service, and all other competitive platforms, and which may not be recoverable at all.

Q. What sorts of costs would be imposed by the Commission's unbundling/line card collocation requirements?

A. There are at least three kinds of costs that would issue from these requirements. Mr. Keown provides a study that quantifies these costs.[59] The first kind of cost derives from the fact that the unbundling requirements would result in inefficient use of the capacity of the system architecture. In particular, unbundling the ADLU cards to CLECs will result in less efficient use of the NGDLC line card slot capacity. To see why, suppose that there are 10 customers in a given service area interface ("SAI") that are purchasing DSL service. If these 10 customers were served by five different CLECS, two customers each, using the wholesale Broadband Service offering, they could be provisioned using three ADLU line cards in three slots. The first two cards, with four ports each, would be fully utilized, and the third would be half utilized, with two empty ports. Now suppose that rather than using the Broadband Service, each CLEC purchased and installed its own line

[59] Ameritech Illinois, Exhibit __ (Keown).

card. In that case, serving the same 10 customers would require five line cards and consume five slots instead of three, and each slot would have two empty ports for a total of 10 empty ports, instead of two. It is readily apparent that the NGDLC would run out of line card slots more quickly, and situations could arise in which one CLEC would have filled all its cards and want to serve additional customers, but no more line card slots would be available, even though other CLECs had empty ports.

My example assumed all 10 customers lived in the same SAI. If they were divided among different SAIs served by the same RT, the capacity loss would be even greater, because the same line card cannot serve customers in different SAIs.

This inefficient use of the line cards translates to increased capacity cost. From a statistical standpoint, the same capacity investment would typically be capable of serving fewer customers. The more CLECs there are in the RT, the greater the inefficiency, and the greater the additional cost per customer.

Q. What other sorts of costs are caused by the unbundling requirement?

A. The PVP unbundling requirement opens the door to the strategy I described earlier, in which CLECs co-opt much or all of the available capacity in order to provide alternative, bandwidth-hogging services for high-end customers. It would require only three CLECs pursuing this strategy, or one CLEC purchasing all the PVPs, to co-opt the entire DSL capacity of an NGDLC in an RT, potentially depriving any mass market customers served by that RT of access to ADSL services under the Project Pronto architecture. In that case, for Ameritech Illinois to fulfill its business plan to bring ADSL services to those customers, it would have to replicate most or all of the entire Project Pronto investment. Mr. Keown estimates the cost of such an undertaking in his testimony.[60]

[60] Ameritech Illinois, Exhibit __ (Keown).

Q. What other sorts of costs are imposed by the unbundling requirement?

A. A third category of costs associated with the Commission's unbundling requirement is the cost required to develop Operations Support Systems ("OSS") and back office systems to manage, track, inventory, repair, and maintain the unbundled elements.

Q. What is the magnitude of these costs?

A. Mr. Waken details the modifications to the back office systems that may be required to maintain other CLECs' equipment. He estimates that these back office systems costs would be on the order of $95 million to $132 million. This estimate does not include costs to modify the CLEC interfaces (OSS systems), which would clearly impose additional costs.[61] It was originally anticipated that the Project Pronto investment in Illinois would have been $519 million. Taken in the context of the $519 million, just this anticipated extra cost for modifying the back office systems amounts to an increase of between 17 and 28 percent over the initial planned investment.

Q. How should these back office costs be recovered?

A. From a cost-causation standpoint, the costs of the back office systems to implement unbundling should be recovered from the carriers who order these unbundled elements. To the extent, for example, that a carrier were to order the wholesale Broadband Service, that carrier should not be burdened with the recovery of the back office costs incurred to provision the "Project Pronto UNEs" or "collocated" line cards.

Q. How should the costs caused by inefficient use of the capacity due to unbundling be recovered?

A. The costs of the capacity of the NGDLC that becomes unavailable when a CLEC uses a slot should be recovered from the CLEC purchasing the line card (or use of the slot). That is, because the CLEC that purchases the line card slot from Ameritech Illinois would

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[61] Ameritech Illinois, Exhibit __ (Waken).

deprive all other CLECs from using the 4 ports associated with that slot, and would deprive Ameritech Illinois from selling its wholesale Broadband Service over those 4 ports, the cost-based rate should reflect the entire lost capacity, regardless of how many of the ports the purchasing CLEC chooses to use. The cost of this capacity should also reflect the fact that due to the unbundling requirements, the expected capacity utilization (or fill factor) would be lower for the system overall.

In addition, this inefficiency would spill over to the wholesale Broadband Service as well, and cause higher costs of selling that service. The reason is that, as I explained earlier, the use of the channel bank (or "CBA") for "collocating" line cards renders the entire CBA less efficient or, put differently, the CBA has less effective capacity in a setting in which such "collocation" is required. Hence, the effective cost of using one port is higher in that setting or, again, the usable fill factor of the system is lower. For example, if a CBA has 190 usable ports (85% of 224, assuming 34 are required for administration and testing purposes) when no unbundling is permitted, then each end-user DSL service order "costs," or deprives others of, $1/190^{th}$ of the CBA capacity. However, if the effective availability of the CBA is only 173 ports (assuming for purposes of the example that 9 percent of the ports become "wasted" due to the inefficiency I explained earlier), then each end-user DSL service order "costs" more – $1/173^{rd}$ of the capacity of the CBA. Hence, even though the inefficient use of the CBA is not "caused" by the wholesale Broadband Service, the effective cost of the wholesale Broadband Service rises.

Q. What is the impact of these costs on competition?

A. There are two effects. First, they disadvantage DSL providers using these DSL UNEs relative to other DSL providers. As a result, Ameritech Illinois' investment in provisioning Project Pronto DSL "unbundling" may never be recovered at all. Second, they disadvantage DSL relative to competitive broadband service technologies, the most

important of which is cable. As a result, they serve to increasingly entrench cable as the dominant technology for providing high-speed Internet access to the mass market.

Q. Please explain the first effect of the costs of unbundling on competition in the broadband market.

A. Consider a DSL CLEC that wishes to provide ADSL service by purchasing and installing an unbundled ADLU card. Such a CLEC should, if prices are cost-based, bear the per-unit share of the additional back office systems and OSS costs, as well as capacity costs for 4 ports, and a share of the inefficiency costs (lower effective fill factors of the NGDLC system) caused by unbundling. DSL providers who offer ADSL service via the wholesale Broadband Service would not bear the additional costs of back office systems and OSS systems and would pay only for the ports they use (albeit at a higher per port price than would exist if no line card "collocation/unbundling" were required). As I indicated above, the back office systems and OSS costs alone could be substantial. Hence, DSL Service providers using the Project Pronto DSL architecture would, properly, bear costs that their direct competitors would not. This would put them at a disadvantage relative to their competitors, who could profitably underprice them. The greater the disadvantage, the fewer lines these DSL service providers are likely to sell. Moreover, if Ameritech Illinois properly accounts for this effect in its demand estimates, it will realize that it must spread the additional back office systems and OSS costs over a relatively small number of lines, which will increase the cost per line even more, which will result in yet greater disadvantage and, potentially, yet fewer lines sold. In the end, Project Pronto UNE-based DSL providers would find it difficult or impossible to compete, and Ameritech Illinois would have incurred a multi-million dollar sunk investment with no ability to recover it at all. This prospect would certainly chill an investor's desire to risk her capital in the project to begin with.

Q. Please explain the second effect of the costs of the Commission's unbundling requirement on competition in the broadband market.

A. As I explained in Section II, DSL competes directly with cable modem service in the mass market for high-speed Internet access. Indeed, as I explained, cable modem technology is the leading advanced services technology in the market today, and there are substantial first mover advantages in the market because of the reluctance of consumers to switch technologies once they already have one. While DSL may have some native advantages over cable modem service in some respects, it has an uphill fight in the market at the moment because of the native advantages of cable modem service over DSL in other respects that I have described, the head start that cable modem service has had in the market, and the favorable regulatory treatment of cable modem service relative to DSL. Any costs that are imposed only on DSL and not on other technologies are inevitably and unambiguously going to disadvantage all DSL providers, and DSL as a technology, in competition with those other technologies. Currently, as I have shown, DSL service prices are somewhat higher than cable modem service prices. I believe that to compete, DSL providers will have to find ways to decrease prices. If Project Pronto-based DSL providers must instead significantly increase their retail prices in order to cover the additional costs imposed by the unbundling requirement, they will simply lose footing and lose business to the cable modem, satellite, and other technologies. The result will not be increased DSL competition, as the Commission presumably intends, but rather, it will be decreased competition in the market for high-speed Internet access. Cable modem service will become further entrenched as the dominant technology for high speed Internet access. From the consumers' perspective, instead of having a choice of at least two technologies, cable modem service and DSL, and having a choice of multiple DSL providers (from carriers using the wholesale Broadband Service offering or providing DSL service using their own DSLAMs and conventional UNEs), consumers

will have access only to cable modem service, and perhaps some of the fringe technologies such as satellite, to choose from.

Q. In addition to the two reasons you have discussed, are there any other reasons that SBC might reasonably decide not to deploy Pronto in Illinois under the circumstances?

A. Yes. While UNEs are required to be priced at TELRIC-based rates, a rational firm would be concerned that the prices that are ultimately ordered by the Commission would not be truly cost-based. There is a risk that the rates that would ultimately be ordered are not even sufficient to recover the forward looking, long run cost of the assets, let alone their opportunity cost. The prospect of recovering only one's costs of making a risky investment would be sufficient to chill much private investment, but the prospect of not even recovering one's costs would certainly discourage a company from making the investment to begin with.

IV. THE COMMISSION'S DECISION TO SET THE MONTHLY HFPL UNE RATE AT $0 IS POOR ECONOMIC POLICY

Q. Commissioner Squires has requested that all parties in this proceeding respond to the following question:

14. Please respond to the following regarding a $0 rate for the HFPL:

A) Is there a workable solution to reduce the network access line rate paid by a voice customer to Ameritech-Illinois when the CLEC provides data over the HFPL? If so, please describe. If not, is there an alternative method the ICC can use to ensure that Ameritech-Illinois is not afforded a windfall if a non-zero rate is established for the HFPL?

Would you please respond?

A. Yes. In my opinion it is unnecessary to establish an accounting-type reconciliation of revenues so that Ameritech Illinois does not get a "windfall" from revenues from the HFPL. The reason is that there is an alternative mechanism already in place to discipline

Ameritech Illinois – namely, the powerful arbitrage opportunities afforded CLECs by access to UNE loops. In fact, a "windfall" opportunity is actually created for *CLECs* by pricing the HFPL above zero.

Q. The HFPL is a new UNE offered by Ameritech Illinois. Won't all of the revenue generated by an HFPL UNE rate greater than $0 be incremental to the existing retail revenues associated with the local loop?

A. No, it will not. Although the HFPL is a new UNE, in many cases it will replace the use of current elements or services. For example, many ILEC customers currently maintain a second line for the sole purpose of providing access to the Internet by dial-up modem. The HFPL allows a CLEC to provide much faster Internet access and at the same time eliminates the need for a second line. Revenues from the HFPL will therefore be offset by an associated loss of revenue resulting from the decrease in demand for second lines.

Q. Aside from the offset from lost sales of second lines, will not revenues from HFPL be a windfall for Ameritech Illinois?

A. No. Establishing a non-zero price for the HFPL creates profit opportunities for CLECs that will erode any "windfall."

Q. Please explain.

A. Let us assume, for purposes of exposition, that an HFPL rate is set at 50 percent of the UNE loop rate. In this scenario, we will assume that the UNE loop rate is $10 per month, which implies that the HFPL rate equals $5 per month. In addition, let us assume that the retail local service rate is $15 per month and that this rate covers Ameritech Illinois' incremental cost of providing retail voice service. Hence, the non-loop costs are no more than $5 ($15 - $10). Finally, let us assume that the market price for broadband services, such as ADSL, is $50 per month. The Commission's concern is, presumably, that before the HFPL offering, Ameritech Illinois was receiving $15 for retail voice service, and now

it could receive $20 ($15 for the voice service, plus $5 for the HFPL from a CLEC offering DSL to the customer over the same line).

This creates an obvious profit opportunity for the CLEC, however. The CLEC could purchase the entire loop for $10, and provide both voice and ADSL service to the customer, with incremental revenue from the voice service of up to $15. Relative to purchasing the HFPL at $5, the CLEC's incremental cost of providing the voice service would be only $5 plus the non-loop costs. If the CLEC were equally efficient as Ameritech Illinois, those costs would be no more than $5, *leaving another $5 of contribution or profit for the CLEC.* The supposed windfall for Ameritech Illinois has turned into a windfall of profit for the CLEC. Indeed, even a substantially *less* efficient CLEC has a profit opportunity. If the CLEC's non-loop costs of providing voice service were, say, $8, the CLEC could still undercut Ameritech Illinois (offer a voice service price of, say, $14) and still earn a profit ($1 per line in my example).

The likely result is that either the CLECs would attract the entire customer relationship away from Ameritech Illinois by offering a package of voice and data, or Ameritech Illinois would have to compete by decreasing the price of voice service to customers buying ADSL service. Either way, Ameritech Illinois is deprived of any windfall.

Q. Does this conclude your direct testimony on rehearing?

A. Yes, it does.

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CIVIL AERONAUTICS BOARD, Office of Economic Analysis, Washington, DC, Summers, 1979 and 1980
Staff Economist

HONORS & AWARDS

Guthman Research Chair, Kellogg Graduate School of Management, Northwestern University, Summer 1994.

Hoover National Fellowship, Hoover Institution, 1992-1993.

Faculty Research Fellow, National Bureau of Economic Research, 1987-1990.

Pepsico Research Chair, Northwestern University, 1990.

Kellogg Research Professorship, Northwestern University, 1989.

National Science Foundation Research Grant, 1987-1988.

Buchanan Chair, Kellogg Graduate School of Management, Northwestern University, 1987-1988.

IBM Chair, Kellogg Graduate School of Management, Northwestern University, 1986-1987.

RESEARCH INTERESTS

Industrial organization, antitrust economics, and business strategy, pricing, information industries, network industries, telecommunications policy, theory of the firm, compensation and incentives.

TEACHING

Courses taught: Pricing Strategy; Information, Communication, and Competition (strategy and competition in communications industries); Intermediate Microeconomic Theory; Managerial Economics (microeconomic theory as applied to business strategy and decision making) at the M.B.A. level, The Economics of Information at the Ph.D. level.

Also qualified to teach: graduate Microeconomic Theory; Industrial Organization and Labor Economics; the Economics of Personnel; Public Finance; Applied Game Theory.

PUBLICATIONS AND WORKING PAPERS

1) "Economic Theories of Tying and Foreclosure Applied—And Not Applied—in *Microsoft,*" with Steven S. Wildman, *Antitrust*, vol. 14, no. 1, 1999, pp.48-52.

2) "Effecting a Price Squeeze Through Bundled Pricing," with Steven S. Wildman, in *Competition, Regulation, and Convergence: Current Trends in Telecommunications Policy Research*, Gillett and Vogelsang, Eds., (New Jersey: Lawrence Erlbaum Associates, Inc.) 1999, pp. 1-17.

3) "Worldwide Wait? How the Telecom Act's Unbundling Requirements Slow the Development of the Network Infrastructure," with Ken Dunmore and Frank Pampush, *Industrial and Corporate Change*," vol.7, no. 4, 1998, pp. 615-621.

4) "The Pricing of Customer Access in Telecommunications," with Steven S. Wildman, *Industrial and Corporate Change*, vol. 5, no. 4, 1996, pp. 1029-1047.

5) "Bonus and Penalty Schemes as Equilibrium Incentive Devices, With Application to Manufacturing Systems," with Pau Olivella, *Journal of Law, Economics, and Organization*, 10, Spring 1994, pp. 1-34.

6) "Diversification as a Strategic Preemptive Weapon," *Journal of Economics and Management Strategy*, 2, Spring 1993, pp. 41-70.

7) "Using the Capital Market as a Monitor: Corporate Spin-offs in an Agency Framework," *RAND Journal of Economics*, 22, Winter 1991, pp. 505-518.

8) "Firm Organization and the Economic Approach to Personnel Management, *American Economic Review*, vol. 80, no. 2, May 1990, pp. 23-27.

9) "The Introduction of New Products," with Edward P. Lazear, *American Economic Review*, vol. 80, no. 2, May 1990, pp. 421-426.

10) "Ability, Moral Hazard, Firm Size, and Diversification," *RAND Journal of Economics*, 19, Spring 1988, pp. 72-87.

11) "Worker Reputation and Productivity Incentives," *Journal of Labor Economics*, vol. 5, no. 4, October 1987, part 2, pp. S87-S106.

12) "Imitation and Differentiation in New Product Markets," under second review at *RAND Journal of Economics.*

13) "Competition, Relativism, and Market Choice," with Edward P. Lazear, C.M.S.E.M.S. Working Paper No. 750, October 1987.

14) "An Empirical Analysis of Agency Theory and the Choice of Merger Partners," mimeo, Northwestern University, August 1987.

15) "The Role of Managerial Ability and Moral Hazard in the Determination of Firm Size, Growth and Diversification," Ph.D. Dissertation, University of Chicago, August 1985.

RESEARCH IN PROGRESS

"Balancing Concerns of Price Squeeze and Pricing Flexibility in Regulated Telecommunications Industries," with Gordon Green and Frank X. Pampush.

"Licensing and Access to Innovations in Telecommunications and Information Services," with Steven S. Wildman.

"Optimal Intercarrier Compensation Mechanisms in Network Industries," with Alan S. Frankel.

"Interconnection Pricing in Telecommunications."

SELECTED TALKS

"Local Competition in Illinois," Illinois Telecommunications Symposium, Northwestern University, Evanston, Illinois, December 2000.

"Licensing and Access to Innovations in Telecommunications and Information Services," Telecommunications Policy Research Conference, Alexandria, Virginia, September, 2000.

"Effecting a Price Squeeze Through Bundled Pricing," Federal Communications Commission, Washington, D.C., May 1999.

"Competitive and Strategic Use of Optional Calling Plans and Volume Pricing Plans," The Institute for International Research Conference for Competitive Pricing of Telecommunications Services, Chicago, Illinois, July 1998.

"Effecting a Price Squeeze Through Bundled Pricing," Consortium for Research in Telecommunications Policy Conference, University of Michigan, Ann Arbor, Michigan, June 1998.

"The Pricing of Customer Access in Telecommunications," Conference on Public Policy and Corporate Strategy for the Information Economy, Evanston, Illinois, May 1996.

"Diversification as a Strategic Preemptive Weapon," University of Iowa, Iowa City, Iowa, February 1994.

"Diversification as a Strategic Preemptive Weapon, "University of Buffalo, Buffalo, New York, February 1994.

"Diversification as a Strategic Preemptive Weapon," University of Southern California, Los Angeles, California, December 1993.

"Strategic Pricing" Winter Meetings of the Econometric Society, Discussant, Anaheim, California, December 1993.

"Innovation, Imitation, Productive Differentiation, and the Value of Information in New Markets," Michigan State University, Lansing, Michigan, November 1993.

"Diversification as a Strategic Preemptive Weapon," Rutgers University, New Brunswick, New Jersey, November 1993.

"Diversification as a Strategic Preemptive Weapon," University of California at Santa Cruz, Santa Cruz, California, November 1993.

"Diversification as a Strategic Preemptive Weapon," Graduate School of Business, Stanford University, Stanford, California, November. 1993.

"Innovation, Imitation, Productive Differentiation, and the Value of Information in New Markets," Purdue University, West Lafayette, Indiana, September 1993.

"Innovation, Imitation, Productive Differentiation, and the Value of Information in New Markets," Summer Meetings of the Econometric Society, Boston University, Boston, Massachusetts, June 1993.

"Innovation, Imitation, Productive Differentiation, and the Value of Information in New Markets," University of California, Department of Economics, Berkeley, California, May 1993.

"Innovation, Imitation, Productive Differentiation, and the Value of Information in New Markets," Stanford University, Graduate School of Business, Stanford, California, May 1993.

"Diversification as a Strategic Preemptive Weapon," Stanford University, Graduate School of Business, Stanford, California, April 1993.

"Innovation, Imitation, Productive Differentiation, and the Value of Information in New Markets," Hoover Institution, Stanford, California, April 1993.

"Innovation, Imitation, Productive Differentiation, and the Value of Information in New Markets," University of California, Graduate School of Business, Berkeley, California, February 1993.

"Innovation, Imitation, Productive Differentiation, and the Value of Information in New Markets," Stanford University, Department of Economics, Stanford, California, February 1993.

"Innovation, Imitation, Productive Differentiation, and the Value of Information in New Markets," Hoover Institution, Stanford, California, January 1993.

"Pricing Strategies," Session Discussant, 1992 North American Winter Meeting of The Econometric Society, Anaheim, California, January 1992.

"Diversification as a Strategic Preemptive Weapon," University of Toronto, Toronto, Canada, November 1991.

"Diversification as a Strategic Preemptive Weapon," Queen's University, Kingston, Ontario, Canada, November 1991.

"Bonuses and Penalties as Equilibrium Incentive Devices, with Application to Manufacturing Systems," University of Chicago, Chicago, Illinois, June 1991.

"The Timing of Entry into New Markets," Summer Meetings of the Econometric Society, University of Pennsylvania, Philadelphia, Pennsylvania, June 1991.

"Innovation, Imitation, Productive Differentiation, and the Value of Information in New Markets," University of Chicago, Chicago, Illinois, April 1991.

"Bonuses and Penalties as Equilibrium Incentive Devices, with Application to Manufacturing Systems," Winter Meetings of the Econometric Society, Washington, D.C., December 1990.

"Corporate Spin-offs in an Agency Framework," University of Washington, Seattle, Washington, October 1990.

"The Timing of Entry Into New Markets," University of British Columbia, Vancouver, British Columbia, October 1990.

"Corporate Spin-offs in an Agency Framework," Texas A&M University, College Station, Texas, April 1990.

"Firm Organization and the Economic Approach to Personnel Management," Winter Meetings of the American Economic Association, New York, New York, Dec. 1989.

"Corporate Spin-offs in an Agency Framework," Western Finance Association Meetings, Seattle, Washington, June 1989.

"Corporate Spin-offs in an Agency Framework," University of Rochester, Rochester, New York, May 1989.

"Corporate Spin-offs in an Agency Framework," North American Summer Meetings of the Econometric Society, Minneapolis, Minnesota, June 1988.

"Competition, Relativism, and Market Choice," North American Summer Meetings of the Econometric Society, Berkeley, California, June 1987.

"Competition, Relativism, and Market Choice," University of Chicago, Chicago, Illinois, April 1987.

"Rate Reform and Competition in Electric Power," Discussant, Conference on Competitive Issues in Electric Power, Northwestern University, Evanston, Illinois, March 1987.

"Worker Reputation and Productivity Incentives," New Economics of Personnel Conference, Arizona State University, Tempe, Arizona, April 1986.

"Ability, Moral Hazard, and Firm Diversification," Yale University, New Haven, Connecticut, February 1985.

"Ability, Moral Hazard, and Firm Diversification," University of Rochester, Rochester, New York, February 1985.

"Ability, Moral Hazard, and Firm Diversification," Stanford University, Stanford, California, February 1985.

"Ability, Moral Hazard, and Firm Diversification," University of Minnesota, Minneapolis, Minnesota, January 1985.

"Ability, Moral Hazard, and Firm Diversification," California Institute of Technology, Pasadena, California, January 1985.

"Ability, Moral Hazard, and Firm Diversification," Duke University, Durham, North Carolina, January 1985.

"Ability, Moral Hazard, and Firm Diversification," Northwestern University, Evanston, Illinois, January 1985.

"Ability, Moral Hazard, and Firm Diversification," Brown University, Providence, Rhode Island, January 1985.

"Ability, Moral Hazard, and Firm Diversification," Harvard University, Cambridge, Massachusetts, January 1985.

"Ability, Moral Hazard, and Firm Diversification," University of California - Los Angeles, Los Angeles, California, January 1985.

"Ability, Moral Hazard, and Firm Diversification," University of Pennsylvania, Philadelphia, Pennsylvania, December 1994.

REFEREEING

Dr. Aron has served as a referee for *The Rand Journal of Economics, the Journal of Political Economy, the Journal of Finance, the American Economic Review, the Quarterly Journal of Economics, the Journal of Industrial Economics, the Journal of Economics and Business, the Journal of Economic Theory, the Journal of Labor Economics, the Review of Industrial Organization, the European Economic Review, the Journal of Economics and Management Strategy, the International Review of Economics and Business, the Quarterly Review of Economics and Business, Management Science, the Journal of Public Economics, the Journal of Institutional and Theoretical Economics*, and the National Science Foundation.

TESTIMONY AND OTHER ENGAGEMENTS

For a major Japanese telecommunications equipment manufacturer, *evaluated the revenue potential and desirability of entering several advanced services equipment markets worldwide, for the purposes of assisting the client to evaluate a proposed acquisition,* February 2001.

For Ameritech Illinois, in the matter of PrimeCo Communications Inc. v. Ameritech Illinois, Testimony of Debra J. Aron, *provided testimony as to the extent of competition in the Chicago area for high capacity (broadband) wireless and wireline dedicated access services; and as to the economic principles pertaining to the role of the courts in enforcing contracts,* January 2001.

For Avantel, S.A., in response to Request for Consultations by the U.S. Trade Representative (USTR) with the Government of Mexico before the World Trade

Organization (WTO) regarding barriers to competition in Mexico's telecommunications market, *analyzed regulated switched access rates in the U.S. in comparison with those charged by Telmex,* November 2000.

For Southwestern Bell Telephone of Texas, Declaration of Debra J. Aron, *analyzed proposed regulation aimed at preventing incumbents from executing a price squeeze; developed a framework for evaluating claims of a price squeeze consistent with antitrust principles of predation,* August 2000.

For Yellow Cab Company, *analysis of regulatory requirements in the City of Chicago pertaining to valuation of medallions and valuation of capital for purposes of regulatory ratemaking proceeding,* 2000.

For Ameritech: written and oral testimony in Illinois and Michigan in various arbitration matters pertaining to the proper compensation for the use by competitors of client's facilities for foreign exchange services, 2000.

For a firm in the aluminum fabrication industry, in the matter of a potential merger between vertically integrated competitors: *developed a methodology for adjusting the HHI measure of market concentration to account for the vertical control by the merging parties of downstream competitors.* 2000.

For a large newspaper publisher, in the possible acquisition of the San Francisco Chronicle: *analyzed the potential antitrust impediments to an acquisition by the client of the Chronicle, including issues of geographic and product market definition, the interplay between advertising markets and customer markets, and the relevant implications of the Newspaper Preservation Act.* 1999.

For Ameritech Illinois: written and oral testimony regarding the proper economic interpretation of the standards for declaring a service competitive under the Illinois Public Utilities Act, and quantification of the extent of competition in relevant Illinois markets: *including discussion of market definition, the relevance of entry conditions, and implementation of a new technology-based method of measuring market participation,* 1999-2000.

For Rand McNally in the acquisition of Thomas Brothers Maps: a*nalyzed market definition, concentration, and efficiencies from the proposed merger,* 1999.

For Ameritech: affidavit submitted jointly with Robert G. Harris to the Federal Communications Commission in the matter of "unbundled network elements" and commenting on the proper interpretation of the "Necessary and Impair" standard, *including discussion of entry conditions and the business-case approach to valuation of an entry strategy,* April 1999; reply affidavit May 1999.

For Ameritech: "An Analysis of Market Power in the Provision of High-Capacity Access in the Chicago LATA," submitted to the Federal Communications Commission, *including an analysis of the US DOJ merger guidelines and their applicability to regulatory relief in a regulated market,as well as extensive empirical modeling of the costs and business case for network buildout of high capacity facilities,* February 1999.

For Ameritech: "Proper Recovery of Incremental Signaling System 7 (SS7) Costs for Local Number Portability," White Paper submitted to the Federal Communications Commission, April 1999.

For Universal Studios, in the proposed merger between Bertelsmann & Kirsch: *analyzed the potential anticompetitive effects of control of the programming rights for anchor channels, satellite capacity, and decoder technology. Evaluated potential remedies in media mergers, 1998.*

Written and oral testimony on behalf of Ameritech Indiana regarding the economics of resale of local exchange services; testimony on behalf of Ameritech Illinois regarding a new model and methodology for estimating the cost of unbundled local switching; written and oral testimony on behalf of Ameritech Michigan regarding the provision of intraLATA toll service to customers of competing basic local exchange service providers; written and oral testimony on behalf of Ameritech Wisconsin regarding the determination of proper forward looking costs for purposes of determining Federal Universal Service support; 1998.

For Ameritech: affidavit submitted to the Federal Communications Commission in the matter of "Telephone Number Portability," regarding competitively neutral cost recovery for shared and common costs for permanent local number portability.

For Ameritech Michigan: affidavit submitted to the Federal Communications Commission in the matter "Application by Ameritech Michigan for Authorization under Section 271 of the Communications Act to Provide In-Region, InterLATA Service in the State of Michigan."

For Flowers Industries, in the proposed merger between Flowers and Franklin Baking Company: a*nalyzed potential efficiencies from the merger, market definition, and potential entry into the relevant geographic market.*

For Optus Vision of Australia, in the proposed merger between Australis and Foxtel: a*nalyzed the competitive effects in the Australian pay TV industry of the proposed merger. Specifically analyzed issues of market power in the cable television industry with respect to cable TV programming and the ease of entry and exit.*

For the Appraisal Institute: in the case of The Appraiser's Coalition, et. al, v. Appraisal Institute, et. al, Civil Action No. 93 C 913, U.S. District Court, Northern District of Illinois, Eastern Division, a*nalyzed issues of market power, market structure, market share, concentration, entry and exit, and antitrust injury.*

Written and oral testimony on behalf of Ameritech in Illinois and Wisconsin in state arbitration proceedings pursuant to the Telecommunications Act of 1996, regarding the issue of limitations of liability in provision of telecommunications services; testimony on behalf of Ameritech in five states in proceedings before the state regulatory commissions to determine economic costs of providing unbundled network elements to competitors under the FCC's "TELRIC" cost theory pursuant to the Telecommunications Act of 1996; 1996-1997.

For the FTC: Revco's proposed acquisition of Rite-Aid. *Analyzed issues of market power, market structure, market share, concentration, entry and exit, and antitrust injury.*

For the Estate of Reginald F. Lewis: in the case of Carlton Investments v. TLC Beatrice International Holdings, Inc, Loida Nicolas Lewis, as Executrix of the Estate of Reginald F. Lewis, et al., *analyzed structure of executive compensation and firm and industry performance to determine whether compensation was in compliance with CEO's fiduciary duty.*

For Telus of Canada: analyzed economic issues pertaining to access to cable television channel capacity, bottleneck facilities, competition, and cost, November 1996.

For Ameritech Cellular: Reports of Debra J. Aron, "Pricing Strategy for Cellular Telephone Services," *Examined consumption patterns of cellular telephone services for demand elasticities and evidence of risk aversion, developed* entirely *new pricing strategies for cellular services in each of six major cellular telephone markets, and estimated the likely revenue effects of the strategy change for each market. Also developed and provided software to the client for estimating the revenue effects and the proposed pricing strategies,* October 1994, November 1995.

For Ameritech Michigan: testimony submitted to Michigan Public Service Commission on efficient pricing of local exchange services; testimony submitted to Michigan Public Service Commission on "just and reasonable" price increases in local exchange services; 1995.

For the Chicago Mercantile Exchange: "An Analysis of the Marketability of a CPI Future" (with Edward P. Lazear), February 1985.

For the University of Chicago: Report of Debra J. Aron, "Efficient Pricing of Telecommunications Equipment at the University of Chicago," 1985.

As a Professor at Northwestern University, Dr. Aron has supervised numerous student consulting projects in which pricing strategies were analyzed for industries including health clubs, toys, paper products, food products, athletic shoes, and hardware.

PROFESSIONAL ORGANIZATIONS

Member, American Economic Association

Member, Econometric Society

Associate Member, American Bar Association

PERSONAL INFORMATION

Born: March 15, 1957
Los Angeles, CA

February 2001